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BEE CULTURE

False hellebore believed to be poisonous to bees.--Geo. H. Vansell and Wm. G. Watkins, of the Davis, Calif., laboratory, have been making investigations of plants that might be poisonous to bees. They report that "At Pyramid, Calif., bees were dying rapidly. Dying bees at one hive were counted and showed an accumulation of 34 dead young adult bees in 40 minutes. Two days later, on the return trip, another count was made and 259 dead bees were collected from this hive. All colonies were affected. Upon opening the hives, bees would be seen clinging to the comb, as if the claws were somewhat attached; at the least jar these bees would fall to the bottom of the hive in the characteristic curled position assumed when one bee has been stung by another. The bees were working largely upward to higher elevations to the north. Later Watkins found many acres of Veratrum californicum in bloom on the flats 1,000 feet above the apiary. On these plants were found not only dead and dying bees but great numbers of other insects. Bees not yet dead were found clinging to the blossoms by the fore claws, and dropping when slightly jarred. The evidence indicates that this plant is responsible for the poisoning. As its blossoming time passed, the unusual death of bees ceased."

FRUIT AND SHADE TREE INSECTS

Oriental fruit moth travels 9,900 feet.--W. P. Yetter and L. F. Steiner, who are conducting bait-trap experimental work with the oriental fruit moth, (Grapholitha molesta Busck) at Cornelia, Ga., have reported migration records of three marked moths that traveled more than one and one-half miles each, the exact distance being 9,900 feet, 9,400 feet, and 9,250 feet, respectively. The longest distance was traveled by a female moth. After capture she was confined in an oviposition jar with peach twigs and deposited 14 eggs before becoming too weak to deposit any more. Upon dissection she was found to contain 21 mature eggs and 78 immature ones. The three flights were remarkable not only for distance but because they were made across or against the wind from one baited orchard to another, and apparently over more than a mile and a quarter of unbaited peach and apple orchards.

Survey of parasites of oriental fruit moth in twigs.--H. W. Allen, Earl Lott, and H. C. Shaner, of the Moorestown, N. J., laboratory, have

brought together the following summary of a survey made during the past season of the parasitization of oriental fruit moth larvae in peach twigs: "The outstanding features of this work so far noted are (1) The low percentage of parasitism of twig-infesting larvae of the first brood in all but a few restricted localities; (2) the occurrence of Macrocentrus ancyliivorus Rohwer, particularly in broods following the first, in many widely separated localities in which it was not known to occur as a parasite of the fruit moth before the liberations of the past three seasons; (3) the comparatively high rate of parasitism of Cremastus probably minor Cush., and of Pristomerus ocellatus Cush. in a number of localities; (4) the dominance of M. delicatus Cress. in eastern Tennessee and of Glypta rufiscutellaris Cress. throughout the hilly and mountainous northern Appalachian region; and (5) the absence, this season, of any recovery of introduced European species in collections of twig-infesting larvae, unless the few Ascogaster obtained at Moorestown are the progeny of the European Ascogaster quadridentatus Wesm. liberated last season."

Skunks eat peach borers.--The experimental work on the peach borer (Aegeria exitiosa Say) conducted by H. G. Butler at Harriman, Tenn., has been seriously interfered with by some unknown predator that has been digging up peach borer cocoons and removing the larvae or pupae from them. An examination of the material from the stomach of a skunk killed in the orchard revealed large numbers of lepidopterous larvae, quite evidently those of the peach borer.

Fig trees especially susceptible to injury by lubricating oil emulsion.--A. W. Cressman, in charge of the laboratory at New Orleans, La., conducted numerous tests of oil emulsions for the control of the fig mealybug, Pseudococcus sp., and reports: "The summer's work has established the fact that fig trees will not tolerate lubricating oils in dosages sufficient to be effective against mealybugs."

Apple growers assisted in making their own oil sprays.--E. J. Newcomer reports that, following directions furnished by the Yakima, Wash., laboratory, more than 25 growers have successfully made their own oil emulsions this season for both dormant and summer use. About 60,000 gallons have been made at an average saving of 25 cents per gallon. The formula used by most of these growers is as follows:

Oil	100 gallons
Water	33 gallons
Casein (finely powdered)	3 pounds
Ammonia (28 per cent)	1 quart

Nicotine tannate injurious to apple foliage previously sprayed with lead arsenate.--R. F. Sazama, in charge of the laboratory at Vincennes, Ind., makes the following report: "An interesting thing is that lead arsenate and nicotine tannate can not be applied to the same tree without disastrous results. One of the trees in the nicotine tannate plot re-

ceived a small amount of lead arsenate drift in one of the applications and that branch was very severely injured. Further proof of this is the fact that in the Purdue University plots at Mitchell, Ind., a block was sprayed with lead arsenate in the first brood period and then with nicotine tannate, with serious injury."

Effect of nicotine tannate on grape leafhoppers.--G. A. Runner, of the Sandusky, Ohio, laboratory, reports that nicotine tannate applied for the purpose of controlling the grapeberry moth (Polychrosis viteana Clem.) has resulted in the "almost complete eradication of grape leafhoppers (Erythoneura comes Say and related species) of the second brood. The nymphs were destroyed and, possibly owing to a repellent effect on adults, the treated blocks are now practically free from leafhoppers, whereas adjoining untreated vineyard blocks are very heavily infested."

JAPANESE BEETLE AND ASIATIC BEETLE RESEARCH

Castor oil plant poisons Asiatic garden beetle.--"Studies have been made," reports H. C. Hallock, Westbury, N. Y., "in regard to the toxicity of the castor oil plant to the Asiatic garden beetle. When favored food plants are present the beetles will feed on the castor oil plant nearly as much as on the favored plants. Beetles that have fed on the castor oil plant are paralyzed before they can dig into the ground. Part of the beetles recover but this recovery is small when the lower leaves of the plant are removed so that the paralyzed beetles are allowed to lie on the ground in the direct rays of the sun."

Japanese beetle poisoned by feeding on silver-bell tree.--Henry Fox, of the Moorestown, N. J., laboratory, reports that "Late in the summer of 1931 information was received from officials of a bank in Trenton, N. J., to the effect that Japanese beetles feeding upon the foliage of a small tree, growing in the yard back of the bank building, apparently were killed in large numbers as a result of so feeding. * * * The tree proved to be the silver-bell tree, Halesia (or Mohrodendron) carolina L., a native of the Southeastern States, but often grown in cultivation in the Northern States."

No tested materials will prevent oviposition by Japanese beetles.--"The oviposition-repellent work (by F. E. Baker, Moorestown) has been completed for this season. * * * It was found that colors did not repel beetles from or attract beetles to trays of sod or fallow ground for oviposition. In addition to colors, various liquid materials were incorporated in hydrated lime and dusted on the surface of sod and fallow ground. Cresol, Dippel's oil, pine oil, limpid oil, o-chlorophenol, chloronaphthalene, neutral hydrocarbon oil, and kerosene were used in 5 per cent dusts. All of these dusts were applied to the surface of the ground at the rate of 1,000 pounds per acre. No material used repelled or attracted the beetles to the ground for oviposition. A 10 per cent dust of geran-

iol with kieselguhr failed to affect oviposition, as did the standard trap bait when spread on the surface of the ground. A few miscellaneous materials, including sulphur, anthracene, potassium ethyl xanthate, o-nitrophenol, kieselguhr, lime, and a-naphthol were dusted on the surfaces of sod and fallow ground at the rate of 1,000 pounds per acre. No material had any effect on the oviposition by the beetles."

Paradichlorobenzene in soil kills ovipositing Japanese beetles.--"Paradichlorobenzene was tested as an oviposition repellent (by F. E. Baker) by dusting it on the surface of sod and fallow ground at dosages up to 4,000 pounds per acre. In less than 5 hours all of the material had dissipated and was of no use in this respect. When this material was mixed with fallow ground, it seemed to persist in the soil for a considerable period of time. When used in this manner it was successful in greatly reducing the number of eggs laid in the soil. Reductions of 94.4 per cent, 100 per cent, and 99.5 per cent in the egg population after exposure to large numbers of beetles for a week were effected with dosages of 1,000, 2,000, and 4,000 pounds per acre, respectively. This reduction in the number of eggs was not due to any repellency on the part of paradichlorobenzene, because large numbers of beetles were found in the soil apparently having been killed by the vapor of the chemical before they could lay their eggs."

Fertilizers do not affect grub insecticides in soil.--W. E. Fleming and F. E. Baker report that "Emergence records of Japanese beetles from poisoned field plots (at Moorestown) were completed, as no beetles had emerged from any plot over a 10-day period. These records show very definitely that this method of determining an infestation is as satisfactory as an examination of the soil for larvae, if not more so, except in cases where the infestation at definite times is desired. They also show that after 12 months in the soil, fertilizers seem to have no effect on the toxicity of acid lead arsenate, di-calcium arsenate, or barium fluosilicate to grubs. While acid lead arsenate and di-calcium arsenate seem to be just as effective after a 12-month period in the soil, barium fluosilicate has greatly deteriorated in value. It would seem that under soil conditions this latter material ceases to be of value as an insecticide after the first season."

European loosestrife host of Japanese beetle.--R. J. Sim, Moorestown, found that "In northern New Jersey, along the Delaware above Trenton, the beetles were feeding in large numbers on purple loosestrife (Lythrum salicaria L.). This introduced European weed was resorted to, evidently, subsequent to heavy defoliation of trees and shrubs."

TRUCK CROP AND GARDEN INSECTS

Turnip aphid under insectary conditions prefers mustard.--Norman Allen, Baton Rouge, La., reports that "During August it has been found that the turnip aphid (Rhopalosiphum pseudobrassicae Davis) under insectary

conditions not only prefers mustard to turnips but develops faster, becomes larger and more vigorous, is more prolific, and lives longer than when fed on turnips. The aphids reared on mustard were almost twice as large as those reared on turnips, and reproduced as well on mustard as they did on turnips during January and February."

Corm treatments for gladiolus thrips in western New York.--C. A. Weigel and Floyd F. Smith, of the greenhouse insect investigations, Washington, D. C., spent the period August 9 to 12, inclusive, with F. L. Gambrell in western New York in a study of the overwintering of the gladiolus thrips (Taeniothrips gladioli M. & S.) out of doors and the effectiveness of the corm treatments used by the growers. Their deductions include the following statements: "Where the calcium cyanide fumigations were improperly repeated and there was a variation in the length of the immersion period in mercuric chloride solution, the kill of thrips, although high, was incomplete. * * * The ineffectiveness of a 24-hour treatment in lye solution was demonstrated by one grower. Where no treatments were applied the great increase in infestation of thrips in a large planting in two succeeding seasons was observed. * * * The nonoverwintering of the thrips out of doors was definite in a limited number of instances, including four places where the corm treatments had been completely successful and at one of these places where the corms left in the ground were free of thrips. * * * From the observations of the success of the several corm treatments as used by the various growers, the treatment with naphthalene flakes would probably be one of the most reliable as to results, simple as to application, and cheap as to cost."

FOREST INSECTS

Control measures reduce Douglas fir beetle 50 per cent in Cody Canyon.--James C. Evenden, Coeur d'Alene, Idaho, reports that "To determine the results of control measures instituted in the fall of 1931 against an outbreak of the Douglas fir beetle in the Douglas fir stands of the Cody Canyon, a survey of the infested areas was conducted during early August. This infestation occurred in the valuable scenic timber stands that have been severely weakened through defoliation by the spruce budworm, making the task of control a difficult operation. The data secured from this survey indicated a reduction in the infestation of over 50 per cent * * * This reduction * * * was rather satisfactory, considering the difficulties encountered in conducting the project." Mr. Evenden was assisted in conducting this survey by T. T. Terrell and J. M. Miller, of the Bureau of Entomology, and by C. C. Spencer, of the Forest Service.

Windfalls increase bark beetles in Northwest.--"A windstorm of unusual severity in April, 1931, blew down vast quantities of timber through the Cascade Mountains in both Washington and Oregon," reports F. P. Keen, Portland, Oreg. "The down trees served as a favorable breeding ground for many bark beetles, which has resulted in a beetle outbreak in the standing timber of many localities. One such outbreak was investigated in Klickitat County, Wash., on the Yakima Indian Reservation and adjoining

private lands. Six per cent of the stand on 56,000 acres was killed by two generations of bark beetles following their emergence from the wind-falls. The epidemic is now declining rapidly as a result of better growth conditions."

Hemlock looper found inland in Cascades.--Mr. Keen also says that "A report from the Snoqualmie National Forest in Washington of trees dying on an area of about 100 acres was investigated by J. A. Beal. This was found to be an outbreak of the hemlock looper (Ellopiia fiscellaria var. lugubrosa Hulst) and is the first time that this insect has been found inland in the forests of the Cascades. All previous outbreaks in this region have been near the coast. The outbreak has been in progress several years and is now on the decline."

Parasitization of gipsy moth by *Sturmia scutellata* R.D.--Data obtained in a survey in three sections of New England by J. A. Millar, of the Melrose Highlands, Mass., laboratory, show the effectiveness of parasitism of the gipsy moth by *S. scutellata* to be 1.5 per cent, 14.4 per cent, and 31.2 per cent, respectively.

Habits of oriental moth parasite, *Chrysis shanghaiensis* F. Smith.--Regarding his studies on *Chrysis shanghaiensis* received this spring from Japan, D. L. Parker, Melrose Highlands, states that "a total of 298 males and 195 females issued. The females mate readily, deposit a large egg externally on the body of the host (the oriental moth) through a hole in the cocoon, which the female chews with her mandibles. The larva develops rather rapidly and overwinters as a full-grown larva. Oriental moth cocoons are being attacked daily to insure a supply of this parasite next year."

Hornets and white-footed mice prey on gipsy moth.--"In July it was noted," reports C. W. Collins, Melrose Highlands, "that gipsy moth pupae and adults were being destroyed in woodland at Saugus, Mass., by some unknown animal and a number of traps of various types, baited with pupae and adults, were placed on the ground and in trees in the area in an effort to ascertain the identity of the predator. R. C. Brown, who had charge of this work, states that 'during the period August 1 to 25, seven mice, all *Peromyscus leucopus noveboracensis* (determined by G. M. Allen of Harvard University), were caught in the traps. Six mice were caught on the ground or near the ground on sticks leaning against trees. One was caught in a tree about 6 feet from the ground. According to literature this species, although usually a ground species, may build nests in low branches of trees. The fact that it may be arboreal is an important point in the consideration of this mouse as an enemy of the gipsy moth. It seems quite possible that it may be of considerable importance as an enemy of the gipsy moth in light infestations. The species fed on both pupae and adults in the laboratory, one devouring eight female moths in 24 hours. Only the wings were left uneaten and many wings of adults were found in the woodland at Saugus.' This year the hornet *Vespula maculata* L. has removed or destroyed many male gipsy moths caught in various types of traps that S. F. Potts has put out in woodland at Sau-

gus. These traps contain tips of the abdomens of female moths in a solvent, or, in the case of the check traps, living female moths, to attract the males. Although these traps were made so that the male moths entering them would have difficulty in escaping, the hornets have, in general, been able to find their way in and out without much difficulty."

CEREAL AND FORAGE INSECTS

Life history and habits of red harvester ant.--E. V. Walter, who has been observing six cages of red harvester ants (Pogonomyrmex barbatus F. Smith) at San Antonio, Tex., since July 4, reports that "The first eggs were found July 7 and the largest number found in any cage at any one time was estimated at about 60. * * * The first larvae were found on July 17, making a 10-day incubation period. The first pupae were found on July 27, giving a 10-day larval period, and the first young workers emerged as adults on August 6, making a 10-day pupal period, or 30 days from egg to adult. When the female constructs the nest she closes it behind her and does not come out again for any purpose. It is, therefore, necessary that all food for the developing young be found within the nest itself. It has been observed that the first larvae that hatch are fed on the unhatched eggs. One nest in which I estimated 60 eggs at one time had 4 young workers developed. Another nest in which 55 eggs were counted at one time had 6 young workers developed. It, therefore, apparently requires about 10 to 12 eggs for the development of each of the first workers in a nest. These first workers are extremely small, being perhaps about one-fourth normal size. After the first workers have matured the queen begins laying eggs again, and the young workers tunnel to the outside and begin to forage for their food. The larvae that hatch from these later eggs seem to be fed on eggs while quite small, but are soon given the kernels of grass seed that have been thoroughly pulverized."

Parasitism of range caterpillar by Anastatus semiflavus Gahan.--"In May, 1932, J. C. Frankenfeld carried over 3,500,000 range caterpillar (Hemileuca oliviae Ckll.) eggs that had been parasitized at the Tempe, Ariz., laboratory by A. semiflavus to various localities in the range caterpillar territory in northeastern New Mexico, where they were placed on wire stakes in several widely distributed colonies." Samples of these eggs were taken by O. L. Barnes during July and August and were sent to Tempe for detailed examination. Mr. Barnes noted in collecting these eggs that "a large percentage of parasites had emerged and that parasites of both sexes were observed in the immediate vicinity of the stakes. * * *" On the eggs sent to the Tempe laboratory Mr. Frankenfeld reports as follows: "2,134 of these eggs were examined and revealed the following: 35.4 per cent of parasites had emerged; 23.3 per cent of host eggs contained living parasite larvae; 8.7 per cent of host eggs contained living parasite pupae; 5.6 per cent of host eggs contained dead parasites; 13.3 per cent of host eggs were not parasitized; 7.3 per cent of parasites were destroyed by some sucking insect; 1.4 per cent of host eggs were sterile."

Barium fluosilicate dust effective on second generation of southwestern corn borer.--E. G. Davis, Tempe, Ariz., reports as follows on the control of Diatraea grandiosella Dyar: "Dust applications were made earlier in the season to control the second-generation larvae. The dusts consisted of different strengths of barium fluosilicate. One of the dusts had a light mineral oil added to make it adhere to the plant more readily. Plots dusted with 20, 25, and 30 per cent barium fluosilicate and hydrated lime reduced the percentage of infested cornstalks from 70 per cent to 20 per cent. The plot dusted with 30 per cent barium fluosilicate and hydrated lime with oil added reduced the percentage of stalk infestation from 70 per cent to 10 per cent. One plot dusted with an 80 per cent barium fluosilicate dust gave a 100 per cent control, there not being a single stalk infested. The effectiveness of this 80 per cent dust was largely due to its physical make-up rather than to the greater quantity of poison present."

Large shipment of Phaeogenes nigridens Wesm. from Italy received.--H. D. Smith, of the European parasite laboratory, Hyères, Var, France, reports that "A total of 26,100 parasitized pupae (of the European corn borer) and 7,836 adult parasites were collected near Bergamo, Italy, from August 4 to 15 and shipped (about 2,000 per box) in cold storage via Genoa to Arlington. Development was not retarded until arrival on board ship August 11 and August 16. Total corn borer pupae collected amounted to 347,059, representing four days' work by more than 1,000 workers. The infestation was lighter than normal, being from 20 per cent to 30 per cent in most of the fields. * * * The optimum condition for shipping this parasite--a temperature of about 64° F. from time of collection to receipt at Arlington--was impossible to obtain aboard ship and the parasites were allowed to develop normally to adults (the hibernating stage) and then kept in cold storage (46° to 50° F.). This was the largest Phaeogenes shipment ever made in any one year."

COTTON INSECTS

Pink bollworm develops more rapidly in squares than in bolls.--S. L. Calhoun and assistants, Presidio, Tex., report as follows on the biological studies of the pink bollworm (Pectinophora gossypiella Saund.): "Three complete generations of the pink bollworm had completed development in cotton squares at Presidio, Tex., up to August 24, while only one and a partial second generation had completed development in cotton bolls at that date. The average longevity of first boll brood females was 10.35 days and for those of the second square brood it was 8.55 days at mean temperatures of 84.88° F. and 86.36° F., respectively. For males of the first boll brood the average longevity was 10.08 days and for males of the second square brood it was 8.0 days at mean temperatures of 84.82° F. and 86.47° F., respectively."

Bollies more favorable than gin trash for survival of pink bollworm.--W. L. Owen, jr., Presidio, reports that "A total of 18 long-cycle

moths of Pectinophora gossypiella emerged from the hibernation cages during August. The results show that the greatest survival during the winter of 1931-32 occurred in bolls collected from October 30 through November 13, whether installed at the date of collection or on December 11. The survival of long-cycle larvae was more than four times as great in the bollies on the surface as in gin trash on the surface."

INSECTS AFFECTING MAN AND ANIMALS

Mosquitoes captured 4.75 miles from place of release.--"A total of 1,058 mosquitoes were tested for stain in our longevity and flight-range experiments," reports H. H. Stage, Portland, Oreg. "Of these 306 were Aedes vexans Meig. and 752 Aedes aldrichi Dyar and Knab. Seven showed positive traces of blue stain; 6 of these were captured on August 2 and one on August 5, on Hayden Island. These specimens had been stained in a tent and released on June 11, on Sauvies Island. They were therefore captured 52 and 55 days later at a distance of 4 3/4 miles, airline, from the place where stained. At least two stretches of water, the Willamette and Columbia Rivers, each about one-half mile wide, had been crossed."

White shirts less attractive to mosquitoes than colored ones.--Mr. Stage also reports that "In order to determine, if possible, what effect different colors would have in attracting or repelling mosquitoes, C. M. Gjullin tested shirts of different colors as follows: Shirts were worn for a period of 4 minutes each, immediately following one another, and under the same conditions. Counts of the numbers of mosquitoes resting on the back portion of the shirts out to the seams and down to the belt line were made at the end of each 30 seconds for the 4-minute period. In averaging the figures of these preliminary tests it was found that six times as many mosquitoes rested on the black shirt as on the white shirt and that three times as many rested on the brown shirt as on the white. Only one test was made using red and blue colors. The figures for these two colors indicate that more mosquitoes would rest on them than on the white and less than on the brown. As many as 15 adults were counted on the black shirt in a 30-second interval; 55 adults, of which 52 were A. aldrichi and 3 A. vexans, were taken in a 10-minute collection following this test."

A new portable sprayer.--"A new 3-gallon capacity, one man, high-pressure, portable sprayer," the work of Herald M. Brundrett, specialist in insect-spray machinery, "has been just completed and tried out in the laboratory," at Dallas, Tex., reports E. W. Laake. "It embodies such new features as higher pressure, larger surge chamber, simplified pump, accessibility to all parts for repairs, and has the additional advantage over the old type in that one man can handle it nicely. The pump operates very smoothly and easily. The advantage of this sprayer is that it can be carried and pumped with one hand while the spraying is done with the other. It is the most promising sprayer yet produced in this work."

Marsh ditches harbor sand fly larvae.--"At Savannah, Ga.," states W. E. Dove, "records of collections of larvae from soil samples of drainage ditches are consistent in showing that the marsh ditches are serving to collect and concentrate sand fly larvae, ranging from a few to as many as 200 per quart of soil. They are found at the edges of free water and in decaying leaves and soil saturated with tidal water. In some of the ditches only a trace of chloride is found. In others the salinity is approximately the same as that of sea water. Collections made from soil covered by water do not furnish larvae. They are obtained principally from the wet banks of ditches and in the bottoms of ditches having wet soil."

STORED PRODUCT INSECTS

Piping of liquid hydrocyanic acid directly into milling equipment proves successful.--George B. Wagner, Kansas City, Mo., reports that an interesting experiment was conducted in Minneapolis whereby liquid hydrocyanic acid was introduced through piping that led from a loading platform directly into the milling equipment, rather than into the general mill space. This adaptation of a method already in use for introducing another fumigant, was an apparent success, except in elevator boots and flour packers, where unremoved accumulations of flour were too great to allow penetration when only 5 ounces of liquid hydrocyanic acid per each 1,000 cubic feet of mill space was used.

Tobacco moth found in importations of Turkish tobacco.--W.D.Reed, Richmond, Va., who visited a number of warehouses concerned in the importation of Turkish tobaccos, comments: "Observations during August indicate that Turkish tobacco arriving in the bright tobacco belt is generally infested by Lasioderma serricorne Fab. and Ephestia elutella Hbn."

New food records for Ephestia sp.--Perez Simmons, Fresno, Calif., reports that "Decaying apricots on the ground in a Merced County planting were found to be thoroughly infested with Ephestia larvae on August 31. Prune 'drops' in the same area were lightly infested on August 19. Ripe Zante grapes (dried to make 'currants') at Orosi placed on drying trays August 13 and sampled the same day by Dwight F. Barnes were examined on August 24 and found to be infested by larvae and pupae to the extent of about 55,000 insects per ton of fruit."

Mission figs heavily infested with fig moth.--H. C. Donohoe, of the Fresno laboratory, reports that the unharvested portion of the first crop of Mission figs collected from the ground on August 16 "were 100 per cent infested, the first examination showing a population of about 326,000 insects per ton."